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Adopting Inflation Targeting: Operational Framework for Belarus

Summary

The Belarusian monetary authorities have announced plans to change their monetary policy regime and shift gradually to an inflation targeting (IT) framework in the future. Such a strategy of directly targeting inflation brings indeed a number of expected benefits and better economic outcomes with it. However, to secure these benefits and make IT a success, several issues in the operational design and conduct of monetary policy need to be tackled by the NBB.

IT in a country like Belarus faces a number of challenges: the transition context implies a high degree of instability in economic conditions and behavioral relationships, including a less well understood transmission channel of monetary policy actions. Furthermore, high and persistent dollarisation weakens the influence of domestic interest rate movements relative to the exchange rate. Equally, the high degree of openness of the country highlights the prominent role of the exchange rate for the country. Therefore high fluctuations in the exchange rate need to be prevented, implying that the exchange rate can not play the role of the only "shock-absorber" as it does in a classic IT framework. Variants of IT lite that incorporate these features could be the first step towards IT implementation. Afterwards, a shift to classic IT can be established in a gradual manner.

The adequate qualitative and quantitative definition of the target plays a crucial role for credibility and success of IT. We suppose targeting the CPI, quantified as a band rather than a point target to be more expedient. This helps especially in the first period of IT lite to strike a delicate balance between credibility and controllability issues. Regarding the target horizon, we suppose that one year ahead might be an option. This should ensure a high degree of public confidence and also corresponds to the forecasting abilities of the NBB.

Turning to the operational conduct of monetary policy, under IT central banks normally emphasize a short-term interest rate as their key operating target, which is signaled to the market. For this to work out, the central bank needs to predict short-term liquidity levels of the banking system. The reliance on a policy or refinancing rate for open market operations (OMO), coupled with standing facilities around this rate seems the adequate operational framework in our view.

Lastly, a detailed knowledge of the monetary transmission mechanism (MTM) is the key to a successful conduct of monetary policy under IT. We provide some estimations of the Belarusian MTM, which demonstrate that the exchange rate channel is the main channel of transmission in Belarus, while the interest channel seems less operational in comparison. These findings support our previous findings that the exchange rate plays and will likely continue to play a prominent part in the transmission process. There is a high degree of exchange rate pass-through to domestic consumer prices which the NBB needs to take into account. However, in a more long-term perspective, this might also change. The expected future change in the monetary policy framework to IT may well influence the transmission process, changing the relative importance of different channels. A transparent and well coordinated shift to a credible IT framework can therefore enhance the transmission of policy actions by the NBB and lead to a more effective monetary policy.

Contents

1. Introduction

The National Bank of Belarus plans to change its monetary policy framework and to shift to a strategy of inflation targeting (IT) in the future. This decision has been laid down in the "Program of Banking Sector Development in the Belarusian Economy for 2006-2010"[1]. This document mentions a future move to direct IT, which could occur at the second half of this period, and which would be introduced in a gradual fashion.

Such a shift in the monetary policy framework of a transition country like Belarus needs indeed to be well prepared. The right institutional requirements and economic preconditions for such a step need to be in place, as well as specific changes in the operational framework of the conduct of monetary policy have to be made.

Our previous policy paper "Adopting Inflation Targeting: Overview of Preconditions and Institutional Requirements"[2] focused on the first set of issues. Accordingly, the present paper deals with the second set of issues and develops policy recommendations regarding the operational challenges for the Belarusian monetary authorities.

The paper is structured as follows: in Part 2 we identify some challenges to the introduction of IT in the context of Belarus due to its country specifics and discuss the design of the target. The following Part 3 deals with the concrete implementation of monetary policy operations under IT. Next, Part 4 examines the monetary transmission mechanism (MTM) in Belarus. After briefly surveying existing studies, we provide some new empirical evidence based on a Vector Autoregression (VAR) model and a structural model of the Belarusian economy. In Part 5 we conclude.

2. Challenges for Implementation of Inflation Targeting in Belarus

The inflation targeting (IT) regime of monetary policy is based on the unique theoretical concept that determines its advantages. But in practice the IT regime can be interpreted in a different manner and the monetary policy strategy under the IT can differ among countries (e.g. see Daianu and Lungu (2005) and Mishkin, Schmidt-Hebbel (2001)). Furthermore, a range of specific features of a particular economy may alter the concrete design of an IT mechanism. In some cases these specific features may determine ineffectiveness of the IT, thus making questionable the expediency of implementing such a regime. For instance a range of peculiarities is stressed for the IT regime in small open economies (e.g. see Gali, Manacelli (2002) and Svensson (1998)), in dollarized economies (e.g. see (Leiderman et al (2006)), and in economies with a transition agenda (e.g. see Jonas, Mishkin (2003)). All these features apply to Belarus and one cannot state that the classic IT regime is necessarily the best choice for Belarus. Hence potential challenges faced by the Belarusian IT should be thoroughly analyzed.

2.1. Dollarisation and Inflation Targeting

The first potential threat to the IT regime in Belarus to be mentioned is the high level of dollarisation characteristic for the Belarusian economy. One can argue that an IT regime is generally not appropriate for a dollarized economy. First, the difference in monetary transmission mechanism should be considered. An IT regime by definition supposes "an information inclusive strategy in which many variables, not just monetary aggregates or exchange rates are used for deciding the setting policy instruments[3]". In practice it means that the central bank as a rule uses interest rate as a dominant instrument of monetary policy, while other monetary indicators (including exchange rate) are maintained as indicative ones, which may be shock absorbers. At

[1] Presidential Edict No 27 from 15 January 2007, downloadable under: http://www.nbrb.by/publications/banksectordev06-10.pdf.
[2] Policy Paper PP 06/07 by GET-IPM (2007).
[3] Mishkin (2000).

the same time the pass-through effect from the exchange rate to prices is much higher in dollarized economies than in non-dollarized ones. Thus it might be argued that the "classic" design of IT does not work properly in conditions of high dollarisation, leading to a high vulnerability of the inflation trend. Second, the balance sheet effect with regard to dollarized economies should be considered[4]. It assumes that while substantial part of banks' and firms' liabilities are nominated in foreign currency and assets are nominated in national currency allowing the exchange rate to be the shock absorber may lead to significant negative outcomes. For instance, substantial depreciation of the exchange rate may cause a run on the banks because of currency mismatching. Moreover, it may lead to a substantial decline in money demand, which may cause reflation, notwithstanding the policy instruments used for meeting the target trend. These outcomes are in complete contrast with the expected results of depreciation in a non-dollarized economy. However, IT under conditions of dollarisation has chances to be successful. For instance, Leiderman et al (2006) argue that despite different pass-through effects in a dollarized economy, implementing an IT regime sends positive signals to the economic agents. A more transparent and predictable monetary policy provides lower inflationary expectations and facilitates inflation decline. Moreover, they argue that an IT regime itself causes a reduction of dollarisation thus bringing the MTM closer to the "benchmark" one and mitigating possible negative balance sheet effects.

In Belarus in 2001-2006 the level of dollarisation[5] showed a substantial decreasing trend and decreased from about 65% in 2001 down to about 35% in 2006. In early 2007 a small jump took place and still then the level of dollarisation was fluctuating at a level of 32%. But nevertheless the level of dollarisation in Belarus is definitely very high according to international norms. So both the obstacles for IT implementation connected with dollarisation is likely to apply to the case of Belarus. However, despite these obstacles we may argue that implementing IT is possible in Belarus and just through it an additional incentive for a decline of dollarisation may be created. It should be emphasized that a disinflation and a real exchange rate appreciation might have been substantial factors of dollarisation decline in 2001-2006 despite the lack of statistical support for this fact[6]. Thus taking into account all the issues with respect to the implication of dollarisation for the IT monetary policy regime we suppose that high dollarisation does not mean that IT implementing is inexpedient in Belarus in general, but the exchange rate should not be treated as the only absorber of shocks during IT, at least during the initial phase of the shift towards the new regime.

Therefore, the first steps of the transition process to an IT regime should be done in such a manner that sharp and large fluctuations of the exchange rate are limited. The concrete framework of gradually allowing more flexibility may be a (widening) exchange rate band, a crawling band or a managed float, depending on the factors mentioned above.

2.2. Open Economy and Inflation Targeting

The second potential threat for the IT regime in Belarus is the high extent of economic dependence on the external sector (external trade is about 113% of Belarusian GDP). Thus Belarus can be recognized as a 100% small open economy. In this case external competitiveness plays a severe role in the national economy. From the point of view of MTM it determines a relatively high effectiveness of the exchange rate channel and as well as in the case of dollarisation the pass-through from the exchange rate to prices is the dominant one in the economy. Hence quite often countries that may be

[4] Leiderman et al (2006)
[5] We calculate dollarisation level as the share of deposits nominated in foreign currency in the total volume of all deposits.
[6] See Horvath, Maino (2006).

classified as small open economies exploit exchange rate targeting as a regime of monetary policy or at least the exchange rate (i.e. external competitiveness) is considered as a secondary final target. The "classic" design of IT regime for small open economies with inflation as the goal and the exchange rate as a shock absorber actually creates ambiguous goals and may lead to unfavorable outcomes. In regard to Belarus the following scenario might be a threat. The rigid policy under the IT regime may cause an appreciation of the real exchange rate and consequently to a decline of external competitiveness. In a longer-term perspective it may cause pressure on the exchange rate and further depreciation (if the exchange rate is treated as a shock absorber). While the pass-through effect from exchange rate to prices is likely to be most powerful, it may lead to substantial deviation from the target inflation trend. Moreover, in the Belarusian case there is a high probability of having a growing trade deficit due to energy trade. In this environment unrestricted fluctuations of the exchange rate are likely to affect the price level significantly. Moreover, in recent years precisely due to the exchange rate peg that also served external competitiveness[7], there has been a success in inflation decline.

Thus, in the case of Belarus being a small open economy there is a factor requirement identical to dollarisation, i.e. the goal within the IT regime and pursuing this goal should coincide with preventing a high vulnerability of the exchange rate.[8]

2.3. Transition Agenda and Inflation Targeting

The third potential threat for IT in is the fact that Belarus is a transition economy. The major concern with regard to transition economies is unstable relationships among economic indicators representing the behavior of economic agents. One can argue that in transition economies reaction functions of economic agents are sensitive to economic conditions and policies being carried out. Through this the commonly recognized problem of identifying these relationships is emphasized. It means that as a rule quantitative identification of MTM channels in transition economies is problematic[9]. This problem is strengthened due to the lack of statistics available, the low range of statistical samples and at least sometimes non-reliable data in transition countries. All these problems more or less apply to Belarus[10]. At the same time inflation forecasting is the core of inflation targeting, in other words inflation targeting may be interpreted as "targeting the forecast of inflation[11]". So if the central bank is inefficient in forecasting inflation, i.e. it cannot provide consistent and reliable forecasts for a medium-term perspective, it can hardly carry out the IT regime. First, it will not have enough grounds for using this or that monetary policy tools or managing this tool might be contradictory to the declared target. Hence it will mean that a central bank is unable to realize its own forecast, i.e. to carry out its IT regime effectively. Second, the impossibility and/or inability of central bank to provide reliable forecasts will undermine public trust, which is a crucial factor of maintaining a successful IT regime. Thus it may lead to a change in behavior of economic agents notwithstanding those considered by the central bank. It will lead to the necessity of escaping from the IT regime as well. Nevertheless, these threats are not rigid obstacles for implementing the IT regime, while the thesis of forming a more stable and predictable behavior of economic agents under the IT may be argued in analogy with the dollarisation case.

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[7] Estimation of the NBB reaction function by Horvath, Maino (2006) shows that a 1% innovation of the real effective exchange rate leads to an inverse 0.73% change in the nominal exchange rate.

[8] However it should be mentioned here that the context of a small open economy should be analyzed in one line with capital flows. It means that in case of predictable capital inflows the focus of monetary authorities on the external competitiveness may be weakened.

[9] See Ganev et all (2003).

[10] See Horvath, Maino (2006); Kruk (2005); Kallaur, Komkov, Chernookiy (2005).

[11] See Svensson (1997).

Thus, the main requirement for the strategic issues of IT from this point of view is that the goal of monetary policy should be formulated in a way that clearly allows realization over a medium-term perspective.

2.4. Approaches to Implementing Inflation Targeting in Belarus

Keeping the above in mind we can state that the "classic" IT regime is not suitable for Belarus at least at the initial stages[12], while at the same time a high vulnerability of the exchange rate should be prevented and a reliable forecast should be provided. Through this for shaping the strategic issues we initially will choose the design (the relationships of targets and operational tools) of monetary policy during the first steps towards the IT regime which is possible and most proper for Belarus.

Referring to the international experience regarding countries with a dollarized and/or open economy in addition to the "classic" design of IT regime some researchers point out few more strategies of monetary policy that deal with IT to a larger or smaller extent (see Table 1).

Table 1: Alternative Monetary Policy Designs

	Full-Fledged Inflation Targeting (FFIT)	Intermediate Inflation Targeting (IIT)	Fear of Floating Competitiveness Targeting (FFCT)
Primary final target	Inflation	Inflation	Competitiveness
Secondary final target	Competitiveness	Competitiveness	Inflation
Operational target	Interest rate	Monetary aggregate	Rate of crawl
Primary shock absorber	Exchange rate	Interest rate	Foreign assets
Secondary shock absorber	Foreign assets	Exchange rate/Foreign assets	Interest rate

Source: Leiderman et al (2006).

In the FFCT case and partially in the IIT case there is a possibility of preventing high vulnerability to external competitiveness that is severe under conditions of an open economy. Moreover, focus on these regimes coincides with a potentially high pass-through effect of the exchange rate (FFCT to a larger extent extent, IIT to a smaller extent). Objections against these designs may be as follows. First, it does not fully coincide with the IT definition when inflation is treated as the only and dominant ultimate goal. Second, it may weaken the "automatic" character of the monetary policy and thus its transparency and public support. But the impact of dollarisation and high importance of external competitiveness are much more crucial for Belarus. Furthermore, a completely "automatic" monetary policy looses part of its potential for absorbing and preventing shocks.

Thus, in our opinion, in the first stages of the IT regime a choice should be made between FFCT and IIT. The initial choice should be made in favor of FFCT, since it includes the importance of the exchange rate in a way that suits Belarus. If this policy becomes a factor of more stable economic agents' behavior and the rate of dollarisation as well as the exchange rate pass-through effect decline, a further shift to IIT is possible. However, this shift has to be made in a gradual manner because of the factors mentioned, which also govern its speed. In case adverse shocks do not allow a quick transition towards full IT, the time period for reaching it needs to be extended and used for the establishment of the necessary requirements.

2.5. Defining Inflation Targeting Indicators in Belarus

Once having decided to implement the IT regime, monetary authorities should decide on its qualitative indicators and further quantify them. These qualitative indicators

[12] This conclusion depends to a large extent on the time of shifting to the IT regime. The program "Banking Sector Development in 2006-2010" foresees this shift during the last years of this period without fixing a more narrow time interval. But nevertheless it is doubtful that all the factors mentioned – dollarisation, openness of economy and transitional context – may alter their impact in the foreseeable future before implementing the IT regime.

are: the indicator of inflation to target, the time-horizon and in some cases the either direct or indirect character of targeting inflation.

The first issue that substantially determines the design of the IT regime is formulating the monetary policy goal that should be achieved in a medium-term perspective. It is the core of an IT regime that supposes a central bank to use the monetary policy tools for either tightening or softening its policy in case of deviation from this target. The second issue of the strategy is the time-horizon of this goal. It is common knowledge that monetary policy has got a continuous effect on inflation, i.e. today's innovations in the policy will influence the inflation dynamics with a certain lag. Defining the time-horizon is closely connected with the forecasting ability of the central bank and the degree of confidence of the models used. Thus it is connected with the third issue of the IT strategy, i.e. the direct or indirect character of IT. There is no commonly recognized definition of the threshold between direct and indirect IT. However, in some contributions (e.g. see ECB (2004)) the first one means a more automatic using of monetary policy instruments in case of deviation from the target and a shorter time-horizon, while the second one deals with a few grounds of analysis in case of deviation from the target (e.g. two-pillar strategy of the ECB, i.e. economic and monetary analysis) that does not lead to innovations through policy tools per se. Moreover the indirect IT stresses the medium-term orientation of monetary policy and allows even rather substantial deviations from the target in the short-term under the condition of medium term convergence to the target.

Within the FFCT design the problem of formulating a goal is not so sharp. It is evident that defining an explicit point as quantitative goal of inflation keeping in mind the desired trend of external competitiveness is almost unrealistic. Furthermore as seen from a transition context, the target formulated should be achievable.

Thus, in our opinion, the quantified goal of the Belarusian IT regime at least at the first stages should be not a point, but a band.

This band should be forecasted according to the available model(s) keeping in mind the desired (forecasted) exchange rate trend. It is evident that from the point of view of targeting this band should be as narrow as possible. At the same time prognostic possibilities might be not perfect at the initial stages, while the requirement of the true forecast is not of less importance. Thus there should be a compromise between these requirements, while after gaining forecasting experience this band should be narrowed.

Here we must also mention an option between CPI and core inflation as the anchor for IT. One the one hand it should be recognized that prices of commodities in Belarus are for a large part under government regulation[13]. Hence there is a possibility of substantial administrative pressure on prices, which is not under the NBB control. On the other hand the index of core inflation calculated by the NBB does not include such important groups of commodities and services as fuel, utilities and some of the most important food goods (e.g. sugar, vodka, etc)[14]. Hence the dynamics of core inflation will not mirror the price dynamics for households.

[13] There are no figures available about the share of regulated prices in the consumer's basket that is used for calculating CPI. At the same time different methodologies used for calculating the share of regulated prices give figures between 44% (only direct regulation by the government) and 89% (including indirectly regulated prices). See Gotovskiy et al (2006).

[14] There is one more technical problem. The indicator of core inflation excludes only those prices that are regulated directly by the central or local government. But keeping in mind that indirect regulation covers almost 90% of prices in the economy, we may state that this indicator does not exclude all the regulated prices. In general, under conditions of regulation of 90% of prices, the core inflation indicator partly looses its economic meaning.

Thus from the point of view of trust to the target set, we support CPI as the inflation target.

Moreover, while IT assumes more independence of the central bank and less regulation by the government[15], it is also more reasonable to focus on a standard CPI indicator.

Two further issues to be clarified – forecasting the time-horizon and the character of the monetary policy – are closely connected. Both of them are connected with the forecasting ability of the NBB. But the first one is more severe for the public, i.e. for which period the inflation target is set. The second one is more of NBB's own concern, while selecting either a direct or indirect type of IT determines the current choice of the monetary policy tools used. The rigid time-horizon is more connected with direct IT, while an implicit medium-term horizon is more connected with indirect IT.

Defining an explicit time-horizon has the main advantage of informing the public about the planned inflation level during this fixed time interval. Usually deviations from this interval are "automatically" reacted to by the central bank, which makes the policy transparent. At the same time, there can be factors of inflation out of this horizon that may lead to a wrong policy from the point of view of a longer-term perspective. Furthermore, other factors than those included in the model(s) may affect inflation, which may not be mirrored by the defined time-horizon, while they may be reflected in the case of running the indirect IT.

In context of Belarus we recognize a rather important significance of the time-horizon as a "benchmark" for the general public. Nevertheless, the proposed designs (FFCT and IIT) are much closer associated with indirect IT, rather than with the direct one.

Thus at the early stages of IT in Belarus we propose to mix the elements of both ways. First, the band should be set for a fixed time-horizon for ensuring public confidence. The time-horizon should be limited to one year in our opinion, because the level of confidence of one-year forecasts seems to be rather high, while it decreases when extending the time horizon further. At the same time, the medium-term character (more than one year) of IT should be stressed by the NBB, i.e. it should base its policy on different approaches to forecasting inflation (e.g. similar to the two-pillar ECB strategy) that are wider than a short-term public forecast.

Shaping the strategic issues in such a way fully coincides with FFCT and IIT, which assume a broad analysis of inflation as well. Furthermore, it will allow connecting to the forecast and hence to the policy making not just one model, but a set of different types of models covering different time-horizons. This will favorably influence the quality of the forecast and hence the quality of the monetary policy carried out.

3. Monetary Policy Operations under Inflation Targeting Regime

3.1. Goals of Central Bank when Shaping the Operational Framework under IT

Previous analysis shows that a shift to the IT regime is a rather ambiguous step, as it might emphasize the problem of mismatching monetary policy goals. This problem might be more evident when applied to the operational framework of the monetary policy. Implementing the IT regime means that the central bank adopts its operational framework (choosing the prior monetary policy instrument) in such a way that it has control over the key transmission channel.

As a rule the IT regime is carried out under the condition that there is a pass-through effect from the interest rate to the output and prices, i.e. that the interest rate chan-

[15] See our policy paper PP 06/07 "Adopting Inflation Targeting: Overview of Preconditions and Institutional Requirements".

nel (shaped in any form) may be treated as the most powerful one[16]. For the first step of transmission it means that there is a powerful pass-through from the central bank's interest rate to the market interest rate. For the second step of transmission it means that economic agents rapidly and strongly react to changes in the market interest rate. Hence the central bank should shape the operational framework in such a way that the base official rate (most often open market operations rate, OMO) should be transferred to the economy as the average short-term market interest rate.

The market rate is derived from the market interactions of commercial banks. Governing their liquidity level, they plan a definite volume of their operations during the short-term. While the central bank is the legal lender of last resort, these plans of the commercial banks are based on their expectations of the dynamics of the OMO and volumes of needed transactions with the central bank as well. The latter defines the expected probability of using the main refinancing operations and standing facilities. Both the expected probability of using standing facilities and main operations, and expected interest rates (OMO and standing facilities rate (SF)) by commercial banks influence the market rate. Thus the task of the central bank may be presented as minimizing the gap between the expected interest rate by banks and the actual rate. The simplest way to achieve this is to have changes of the official interest rate that are predictable for market agents, and which may take place only according to the schedule. From this point of view the central bank should follow an implicit policy rule when defining its policy rate.

At the same time the central bank faces much the more crucial problem of predicting short-term liquidity fluctuations. In other words, it would be the same to predict liquidity flows governed by commercial banks and thus decreasing their expected probability of using standing facilities. If it is the case, commercial banks will use just main operations at OMO rate for satisfying their liquidity needs and just this rate will be transmitted to the money market. Thus, the key problem in making OMO liquidity, smoothing the rate and providing transmission of this policy rate to the money market is the ability of the central bank to predict short-term liquidity vulnerability and minimize using standing facilities.

3.2. Transmitting the Policy Rate to the Money Market

3.2.1. Predicting the Short-Term Liquidity Level

The short-term money demand may be treated as almost completely inelastic. Through an unexpected increase in the short-term money demand by banks, the money market rate will be pushed up to the SF rate and vice versa. For the purpose of predicting liquidity, the central bank should thoroughly analyze other possible sources of liquidity inflow or outflow. Based on the structure of the central bank's balance sheet we can derive the following relation:

$$\begin{aligned}\textit{excess (lack) of liquidity} = {} & \textit{net foreign assets} + \textit{net claims on government} + \\ & \textit{claims on banks} + \textit{other items(net)} - \textit{cash (outside banks)} - \textit{required or contractual reserves} - \textit{desired (by commercial banks) level of free reserves}\end{aligned} \quad (1)$$

If the central bank has enough information to anticipate flows in these balance items during the short-term, then it can provide a consistent liquidity forecast and thus set the level of OMO that will smooth liquidity vulnerability and provide the needed impact on the money market rate and also on inflation. A part of these items are under the full control of the central bank per se, namely claims on banks (excluding standing facilities), other items (net) and required reserves. The problems in forecasting ade-

[16] It does not mean that other channels that are connected with change in the official interest rate are invalid for a country, but means they are weaker than the interest rate channel. Furthermore, the IT regime can function alongside with the domination of assets price channels.

quately may be caused by unexpected changes in: (i) demand for cash, (ii) demand for a desired level of free reserves, (iii) net foreign assets, and (iv) net claims on the government. Keeping in mind the very short-term of predicting liquidity and inelastic demand for money in it, the demand both for cash and non-cash money is usually determined by autonomous rather than predictable factors. It may be that, say, the days of tax payments or another seasonal factor. Much more of central bank concern are indicators connected with the asset side of the balance that are not controlled directly by the central bank. First, different from the floating exchange rate regime, central bank's foreign assets are treated as a shock absorber in order to maintain the exchange rate target. Hence, net foreign assets are vulnerable in this case, which determine the correspondent liquidity in national currency flows. This vulnerability of foreign reserves applies to a certain extent to all countries, while there are almost no examples of purely floating exchange rates. But in general the vulnerability of reserves is decreasing under the various exchange rate regimes, being highest under the pegged rates and the lowest under the floating rates. Moreover, the share of foreign reserves in the central bank's assets also matters. If the country bases its currency issuance too much on foreign reserves, then even an imaging floating rate and a relatively small inflow/outflow of reserves may inject/withdraw substantially in comparison with the monetary base excess liquidity.

Similar problems for liquidity projections may be caused by unexpected changes in net claims on the government. These net claims mirror both government bonds in the central bank's portfolio and deposits of the central government. As a rule, governments place their deposits that are formed from the consolidated revenues in the central bank. A mismatch between consolidated income and expenditure caused by any reason then will influence the actual money supply. In countries where governments have some seasonal factors in either incomes or expenditures or the government aims at gaining some profits due to marinating temporary profits, the money market will face some seasonal inflow/outflow of liquidity.

Thus, we may argue that the monetary environment should allow predicting short-term liquidity vulnerability in policy-making decisions, which will facilitate OMO (policy rate) to be the effective instrument under IT. At the same time vulnerabilities of foreign reserves and net claims on government may undermine this central bank's ability.

One more monetary policy instrument should be considered in the context of liquidity forecasts, i.e. reserve requirements. Contemporary central banking practice assumes the mechanism of averaging the volume of required reserves during a definite maintenance period. In the view of our discussion this possibility of averaging reserve does not suppose additional unpredictable liquidity flows, but just on the contrary means adoption of an additional liquidity smoothing instrument. As a rule commercial banks use this instrument prior to the standing facilities for regulation of relatively small liquidity deviations. In case of liquidity deficit a commercial bank can withdraw an available under the regulation part of required reserves for recovering the desirable level and vice versa. Hence this mechanism of forming required reserves reduce a bit the demand on standing facilities that enhance the possibility of transmitting the OMO rate to the market. Nevertheless, if the central bank's rate(s) are going to change during the reserves maintenance period, then commercial banks will adjust their liquidity behavior in a direction opposite to the direction of expected change in the interest rate(s). If this is the case instead of enhancing the transmission of the policy rate to the market rate, commercial banks will prevent such a transmission.

The simplest solution is preventing this mismatch between the maintenance of reserve requirements period and the period of the change in the policy rate. Thus the sittings of the body that is empowered to change the central

bank's policy rate should be scheduled on the days at the end of one maintenance period and the beginning of the next one.

3.2.2. Setting the Policy Rates Corridor System

Another possible option for transmitting policy rates towards the money market is narrowing the corridor between rates on standing facilities. As a rule SF rates (on overnight loans and deposit facilities) form the corridor in boundaries of which market rates are fluctuating. Most often it has the same spread between the OMO rate and upper and lower SF rates, which mirrors the central bank's intention to proper regulation of liquidity with equal probability of using standing facilities in both directions. This corridor should create incentives for commercial banks to use OMO rate as their core rate, while the SF rates have a "penalty" character. But at the same time a wide corridor will cause deviations of market rates from the OMO rate if unexpected liquidity movement shave occurs. Moreover, in case of absence of an averaging mechanism of reserves narrower corridor may facilitate to offset liquidity fluctuations. Through this some central banks pursue a tactic of an extremely narrow corridor. For instance the central banks of Australia, Canada and New Zealand all take this approach. Furthermore, since 2006 the Bank of England adopted a reserve averaging system together with a narrow interest rate corridor on the last day of the maintenance period[17]. In general, there cannot be a common solution with regards to the variance of the corridor. It depends on the shape of other monetary policy instruments and the monetary environment.

However, under the IT or transition to IT it is desirable that for any variance of the corridor it should reflect the "neutral liquidity orientations" by the central bank through treating OMO as the middle of the corridor with equal spreads to standing facilities in both directions.

3.3. Improving the Monetary Policy Operational Framework in Belarus under the Transition to IT

The architecture of liquidity regulation and the monetary operational framework in Belarus may be treated as rather developed according to international standards. It reflects the standard contemporary division of liquidity regulation instruments on standing facilities (overnight loans (for one day and within the day) and short-term deposit facilities and open market operations. The latter may be implemented through auction REPO operations (in practice mainly lombard auctions (either rate or volume auctions)) that may be treated as main refinancing operations, longer-term operations and fine-tuning operations on a bilateral basis. Furthermore, the NBB has already implemented the mechanism of reserves averaging. However, despite the almost perfect legal architecture it still does not work the way it should.

The first drawback to be emphasized in using the liquidity regulation mechanism is the intensive use of standing facilities in full and in comparison with main refinancing operations as well. A number of reasons for this may be noted. First, it must be admitted that high liquidity vulnerability is connected with fluctuations in the level of NBB net foreign assets (see Figure 1).

The inverse connection between the dynamics of net foreign assets and using standing facilities is more evident since 2006, when foreign assets became the key factor in base money growth. In general it can only mean that while a significant part of base money is based on hard currency, the adequate liquidity forecast and hence regulation is unlikely to be maintained. The possibilities of liquidity forecasting in Belarus are worsened by another source of base money, net claims on the government, and due

[17] See Gray, Talbot (2006).

to the volatility of government deposits with the NBB. These two instruments formed the major part of base money dynamics during the last years (see Table 2).

Figure 1: Connection between used overnight loans (flow during the months) and change in net foreign reserves

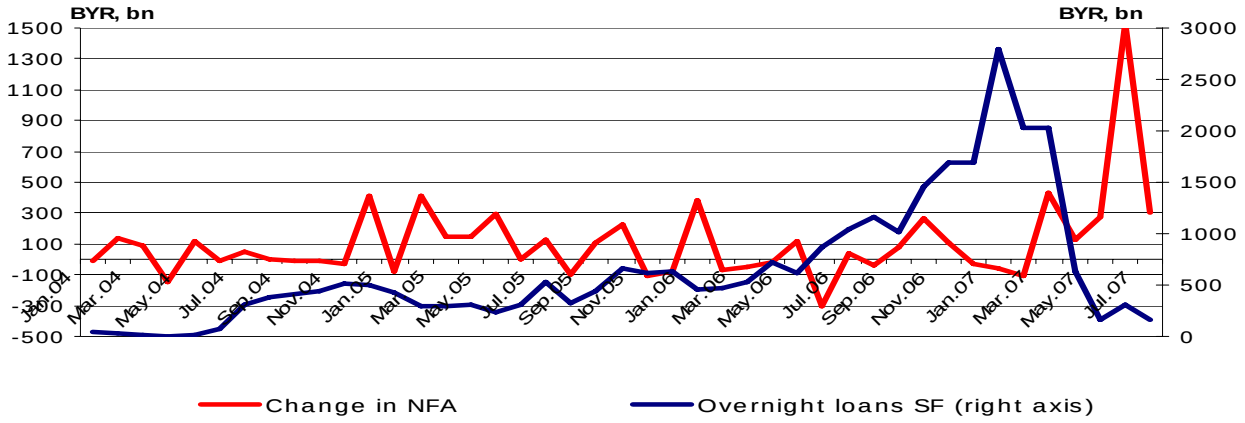


Table 2: Contribution of Different Factors in Growth of Monetary Base (%)

	2003	2004	2005	2006	2007
Net foreign assets	18.6	34.1	46.2	11.4	112.2
Net claims on government	30.8	-18.8	5.3	-12.7	-80.0
Claims on commercial banks	6.8	13.8	10.6	20.0	3.1
Other net assets	-6.8	10.9	3.1	-1.8	-11.3
Monetary base	49.9	41.9	73.7	19.8	38.4

Source: Own calculations basing on the NBB data.

This relationship is rather objective and demonstrates on an operational level the challenges for implementing Belarusian IT in Chapter 2, i.e. dollarisation, openness of the economy and the transition agenda. The composition of base money reflects the external environment of the monetary policy. So this problem that causes the inability to provide a short-term forecast of liquidity and thus to transmit policy rate to the market cannot be treated on the level of operational framework. If the monetary policy environment will change, e.g. only due to the decision to shift to IT as described in Chapter 2, it will influence correspondent changes in base money and the problem will be mitigated.

However, two more issues should be discussed in the context of the Belarusian operational framework. First, it is the prevailing volume of providing liquidity operations in comparison to absorbing ones. As shown above, an effective offsetting policy assumes an equal probability of using both directions of instruments of standing facilities. Hence a proportion with loans dominating over the deposits demonstrates the “liquidity limitation” policy of the NBB. It means that for the NBB the situation of liquidity deficit is more favorable than its excess, because in the last case it will have to incur losses and provide real financing for the excessive liquidity. Besides, the structure of the interest rate corridor maintained is not optimal in our opinion. There is no actual gap between the OMO rate and rate on overnight loans that belongs to the standing facilities. At the same time there is a significant corridor between OMO and the deposit rate, but which is unstable both in nominal and real terms. Partially such a structure may be useful for forming the desired flat yield curve and/or transmitting the desired rate to the money market by narrowing the interest rate corridor from the upper side. But as described in 3.2.2, such approach is only possible under already predictable liquidity flows; otherwise the OMO interest rate risks loosing its anchor meaning for market agents altogether.

Thus, when the decision for shifting to IT has been made, we propose a shift to the corridor where the OMO rate will be the average one with equal

spreads between both SF rates. The variance of this corridor should depend on the ability of the NBB to predict liquidity level during the current time period.

Second, the low economic meaning of the official refinancing rate for the Belarusian market should be emphasized. Today there is no clear economic meaning of the official refinancing rate and no NBB operation is directly connected with the rate. Furthermore, spreads between rates on NBB operations and refinancing rate are also vulnerable both in nominal and real terms. Today, the refinancing rate is mainly an indicative parameter of the interest rate that has been connected through directive measures with deposit and credit market rates.

We suppose that while shifting to IT there should be a clear informative indicator of interest rate (either it will be treated as an operational tool or a shock absorber during the intermediary period) that should be the average of the corridor. Thus, we suppose that the refinancing rate should reflect the actual main OMO rate of the NBB and its change should be made on the scheduled basis on the last day of the reserve maintenance period.

4. The Monetary Transmission Mechanism in Belarus

As a rule, the IT regime means carrying out rather "automatic" monetary policy based on the reaction function of the central bank. Depending on the character of the IT (either directly or indirectly) this policy rule may be entirely or at least partially based on the central bank's estimations of MTM channels. Thus the central bank will use one or the other channel to varying extents, knowing the expected effect of this policy innovation for the real economy in the short-run.

4.1. Existing Empirical Evidence of the MTM Channels in Belarus

Alongside with a range of problems for estimating MTM channels in Belarus due to instable relationships of economic agents' behavior and sometimes missing and/or low reliability of the statistical data there are few papers trying to identify MTM in Belarus. In this subsection we provide a brief analysis of available research.

One of the first papers devoted to this subject was by Kallaur, Komkov and Chernookiy (2005). In this paper the approach of unrestricted VARs is used for testing the MTM channels. They analyze impulse responses from the VARs that include money aggregates, the output gap and industrial production gap (derived through a Hodrick-Prescott filter) and overnight interbank and refinancing interest rates. They argue that the output gap and industrial production gap have a negative response on both the innovation in the refinancing rate and interbank rate. Furthermore, they show the negative significant response of the real refinancing rate on the change in the money supply (M1). According to them, these findings support the validity of the interest rate channel in Belarus. But nevertheless they stress the weakness of this channel. Moreover, they argue for identification of a credit channel in the Belarusian economy. Such a conclusion is empowered by the positive impulse of an industrial production gap on the innovation in the ratio between ruble loans to ruble money (M2). Ultimately, a positive and significant response of inflation on the innovation in the nominal exchange rate proves a strong existing exchange-rate pass-through. In addition there is a strong relationship between changes in the nominal exchange rate and real exchange rate. The latter returns to its equilibrium level when the effect of the nominal exchange rate on prices is over.

The next contribution was made by Horvath and Maino (2006). They exploit the methodology of unrestricted VAR as well and also state the strong pass-through effect from the exchange rate to prices. The positive significant impulse response of prices to the innovation in the exchange rate continues during five periods (months) after the

shock. Besides, they argue that this effect implies a substantial cumulative impact on prices. Further they find rather weak relationships between money and inflation (significantly positive but weak) and between money and output (insignificant), which stipulates obstacles of the second transmission step. The most valuable findings in our context are those connected with Granger causality between the interbank rate and the NBB refinancing rate and estimation of the NBB reaction function. First, the formal test shows that the NBB adjusts its policy rate (refinancing rate) to the interbank rate, which is opposite to what one would expect in a standard monetary policy framework. However, this conclusion coincides with theoretical expectations on the operational framework, where the exchange rate is treated as the dominant target, while the interest rate is accepted from its market value. Second, their estimation of a linear NBB reaction function shows that the NBB depreciates the nominal exchange rate reacting to the deviation from the inflation target (through lagged values of inflation level), appreciation of the real exchange rate and increase in the US Federal Funds rate that is taken as a proxy for interest rate parity. It supports the vision that the actual regime of the monetary policy carried out currently is rather close to FFCT regime where external competitiveness plays a crucial role.

The results of the recent study by Bogetic and Mladenovic (2006) mostly contrast the previous findings. They exploit the VAR methodology as well but at the same time testing it for cointegration, developing a Vector Error Correction Model. On the one hand they also support the strong pass-through from the exchange rate to prices. They find cointegration between prices and exchange rate, stating that prices are determined by a long-run relationship with the exchange rate. There, the same relationship with Granger-causality from exchange rate to prices is valid in the short-run as well. Furthermore, the exchange rate generates the strongest response of prices during the short-term. On the other hand, they state the Belarusian monetary policy has a strong accommodating effect, i.e. the changes in wages are crucial for generating changes in prices. Thus, they conclude that the Belarusian monetary authority reacts on shocks in the real sector, thus weakening their own impulses sent to the economy. The practical use of these results is less valuable, since the sample size was limited to the period of 1996-2001 and since then the monetary policy framework has substantially changed.

4.2. New Evidence on the Belarusian MTM

4.2.1. VAR Methodology

In our opinion the use of VAR methodology for estimating monetary transmission channels exhibits some limitations in general and in application to Belarus as a transition country in particular. First, when analyzing the MTM channels using VARs the division into two transmission steps is worthwhile. As there might be obstacles for transmitting central bank impulses (e.g. through the interest rate) to the intermediate variables (e.g. to the market interest rate), then testing the direct response of either inflation or output (output gap) might include relationships from other channels rather then the tested interest rate channel. In the same manner, the economic meaning of impulse response from the monetary base (aggregate M1) to inflation and output may be ambiguous[18]. At the same time, the mentioned features of dollarisation and the small open economy status give enough theoretical grounds for interpreting responses from innovations in the exchange rate to prices as proof of the exchange rate channel.

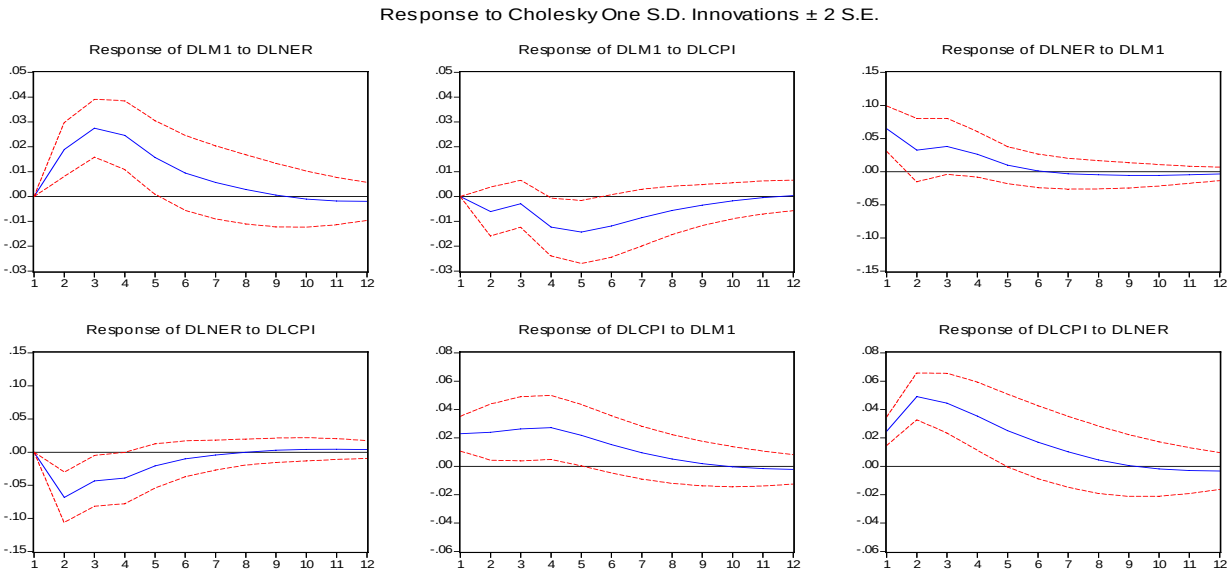
[18] As shown in Kruk (2005) there is no empirical support of the first step of transmission in the interest rate channel, i.e. NBB rates cannot send statistically significant impulses to the deposit and credit market rates. Some relationships between the declared level of the refinancing rate (not the actual level) and market rates (on deposits and loans) are significant and the rate declared by the NBB is a Granger cause for the market rates. But nevertheless these relationships are very weak and in our opinion are reflecting the direct measures that are connecting the declared refinancing rate with deposit and loan rates.

In the context of our discussion we emphasize the following issues regarding the architecture of the MTM in Belarus: (i) the strong pass-through between exchange rate and prices and the role of money within this channel, (ii) relationships and causality among nominal exchange rate, real exchange rate[19] and inflation rate, which both characterize the exchange rate channel, (iii) the possibility of the NBB to transmit the desired impulses to the interbank, deposit and loan rates, which will characterize the first step of transmission within the interest rate channel.

For the first issue we analyze impulse responses in unrestricted VAR of first differences of logged values of nominal exchange rate[20], cumulative CPI and M1 stock based on quarterly data 1995q1-2007q2 (four lags). The results show that (1) there is a strong direct pass-through from the exchange rate to prices (response of dlcpi to dlner), (2) besides the innovation in exchange rate influences M1 (dlm1 to dlner), which may demonstrate the specific effect for a dollarized economy and has a further pass-through (weaker) to prices (dlcpi to dlm1) (see Figure 2).

Furthermore, VAR Granger causality tests show that the nominal exchange rate is the key cause variable for inflation and M1, while the exchange rate itself may be caused only by inflation. These results coincide with those in Horvath and Maino (2006) and stress the supreme role of the exchange rate channel in the Belarusian economy.

Figure 2: Responses of prices, M1 and nominal exchange rate to correspondent shocks.



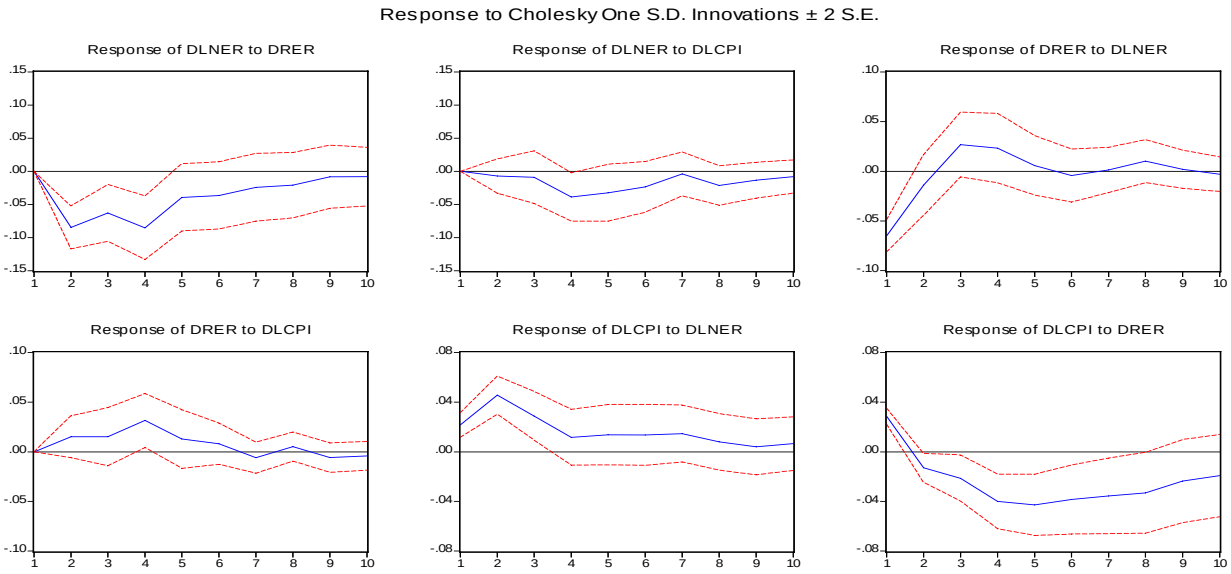
Analyzing the relationship and causality among nominal exchange rate, real exchange rate and inflation we again consider an unrestricted VAR of the first differences of the correspondent logged variables (see Figure 3). This analysis shows significant responses of nominal exchange rate (real appreciation causes nominal appreciation) and inflation (real appreciation causes disinflation) to the shock in real exchange rate. Thus the adjusting mechanism runs as follows: real appreciation causes nominal appreciation, which in turn causes more substantial disinflation and thus enforcing the real exchange rate to an equilibrium level. The Granger test in VAR shows that the real exchange rate is the Granger cause for changes in both nominal exchange rate and inflation. Analysis of this VAR does not say much about the effect of the exchange

[19] With regard to both the nominal exchange rate and real exchange rate we consider the bilateral rate vs. US dollar.
[20] Cumulative index.

rate channel within the economy, but shows the causality of relationship where the real exchange rate is the leading one.

Thus, we can state that the external competitiveness might be of vital importance when governing the current level of nominal exchange rate.

Figure 3: Responses of nominal exchange rate, real exchange rate and prices to correspondent shocks.



In the context of discussion of NBB's ability to transmit its policy rates to the market level we consider in a third step an unrestricted VAR of following logged real quarterly interest rates: refinancing, interbank, on new loans and on new time deposits. Granger causality test does not give support to rejection of any hypothesis that any of these interest rates does not cause another one[21].

Thus, we may state there is no clear proof of NBB abilities to transmit interest rates to the market.

Furthermore if using this VAR for an analysis of impulse responses, it demonstrates responses of other interest rates to the innovation in the interbank rate, while all the responses on the change in the real refinancing rate are insignificant.

4.2.2. Structural Model Methodology

In the IPM Research Centre's quarterly model of the Belarusian economy, there are fewer structural relationships that are of interest in the context of MTM discussion. These relationships demonstrate the validity of the range of the MTM channels not only at a purely statistical level (as in the VAR approach), but at a theoretical level as well, i.e. they give us theoretical grounds for discussing an individual MTM channel. Here we can change the causality a bit and say that while the structural model supports the existence of one or the other channel, there are grounds for more thorough econometric research of this individual channel apart from the structural model.

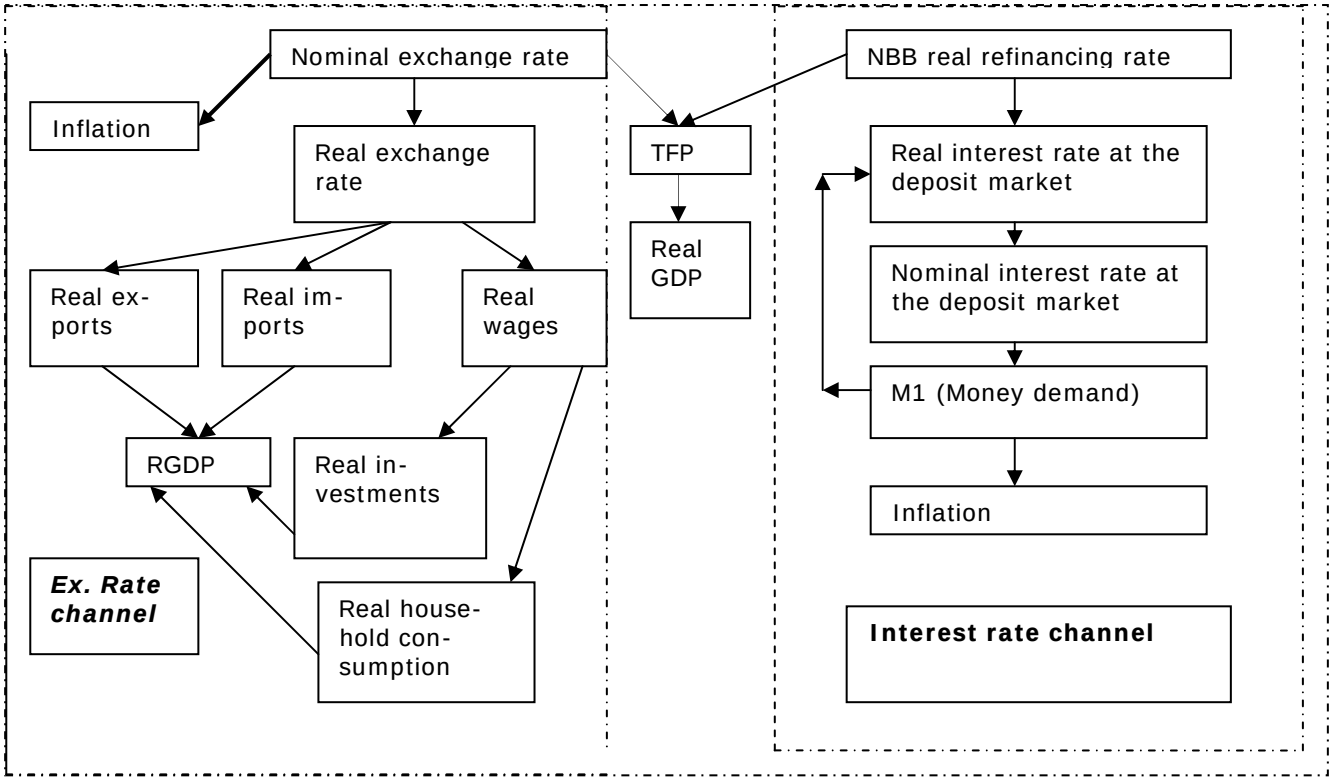
The structural model includes two channels of monetary transmission: the exchange rate channel and the interest rate channel (see Figure 4).

The specifics of the Belarusian economy and some specific features of the modeling determine not fully a "benchmark" structure of the exchange rate channel. For instance, the relatively small scope of the model excludes a range of intermediary vari-

[21] The result might have been worsened due to analyzing quarterly data which may be not an optimal frequency for the interest rates that are rather volatile within the quarter.

ables from it, and due to this we have a very strong direct relationship between exchange rate and inflation. Nevertheless, other relationships of this channel mirror the causality in its influence on the real indicators (components of the aggregate demand and GDP). Furthermore, this specification of the model allows including the interest rate channel in it. But nevertheless the pass-through effect from interest rates to prices is rather weak[22], allowing the interest rate to be a weak predictor of the money demand only in the short-run relationship.

Figure 4: MTM channels in the structural macro model of the Belarusian economy



Two slightly different specifications of the model that are available demonstrate a changing nature of the MTM channels included. For instance, there is no evidence of the interest channel in the second specification of the model, while the role of the exchange rate channel is emphasized. This structural modeling gives enough grounds for exploring and estimating the exchange rate channel, while the existence of the interest channel is still not evident.

Hence, both the VAR approach and the structural modeling approach emphasize the prominent role of the exchange rate channel for Belarus. Under this condition the shift to the new monetary policy regime should be very cautious and the high degree of the pass-through from the exchange rate to prices should be kept in mind.

But there are theoretical and empirical grounds to suppose that the channels of monetary transmission will be changing due to the decision to change the monetary policy regime. In this sense, a NBB shift to IT itself may lead to a more favorable monetary environment for this regime.

[22] Moreover, some assumptions in the model might lead to minor misspecifications in the interest rate channel. For instance, the causality between the NBB rate and market deposit rate was taken without preliminary testing.

5. Conclusions

The purpose of this paper was to discuss and to provide policy recommendations on issues in the operational design and conduct of monetary policy that the monetary authorities in Belarus will face once they embark on the path to IT. In doing so, it complements our previous policy paper on the economic preconditions and institutional requirements that are associated with such a shift in the monetary policy framework.

The introduction of IT in emerging countries like Belarus faces a number of obvious challenges: the high and persistent degree of dollarisation, the high degree of openness and the specifics of the transition process create a special environment for such a regime shift. The first two features highlight the prominent role and importance of the exchange rate for the country. To maintain competitiveness and at the same time support disinflation, high fluctuations in the exchange rate need to be prevented. The third point, the transition process, points to several instabilities in general economic conditions and relationships. Therefore, a medium-term formulation of monetary policy seems necessary. A variant of IT that incorporates all these above-mentioned features is called FFTC, which should be accordingly the first step towards IT implementation. Afterwards, with further progress in the future, a shift to a more “classic” or standard type of IT can be realized. However, this change should occur in a gradual manner.

Turning to the qualitative and quantitative goals of IT to be defined, we recommend targeting the CPI. This goal should be quantified as a band rather than a point target, especially in the first period of FFTC, striking a balance between credibility and controllability issues. Regarding the time-horizon for which the target is set and announced, we recommend to limit it to one year ahead. By doing so, a high degree of public confidence can be ensured, while such a length also corresponds to the forecasting abilities of the NBB.

The conduct of monetary policy under IT normally assumes an operational framework where the central bank sets its instruments in a way that affects market interest rates in a first step, while in a second step these market rates influence general economic variables like prices and output. For the first step to work out, the central bank needs to predict short-term liquidity levels and to strengthen the role of its policy rate. A policy or refinancing rate for open market operations, coupled with standing facilities around this rate seems adequate in our view.

Furthermore, a profound knowledge of the channels of monetary transmission is a key requirement for successfully conducting monetary policy by the NBB. Our estimations of the Belarusian MTM in the form of VARs and a structural model approach are broadly in line with previous researchers’ findings, which show that the exchange rate channel is the dominant transmission channel in Belarus, while the interest channel seems less operational. These findings imply that the exchange rate has played and will likely continue to play a prominent role in the transmission process, as a high degree of exchange rate pass-through affects domestic inflation dynamics. However, a caveat is in order here. Due to the expected change in the monetary policy regime in the future – the shift to IT – the transmission process and the relative importance of different channels may well change. Therefore, a transparent and well coordinated shift to a credible IT framework in itself can enhance policy transmission by the NBB and make monetary management more effective.

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